

Probable Cause: Very similar to Scenario (I), except in this scenario earlier new & missing events were handled.

Action: Discard the event.

5 *Missing Relationship Event*

Problem Scenario #1) Relationship is not contained in the SAN manager 20 service database.

Probable Cause: The relationship went missing before a New-Relationship Event could be processed.

10 Action: Discard the event.

Problem Scenario #2) Relationship is in the SAN manager 20 service database, but its state is Missing".

15 Probable Cause: Very similar to Scenario (I), except in this scenario the earlier new & missing events were handled.

Action: Discard the event.

Possible Actions To Take When It Is Determined That The SAN Manager System Database Is Out Of Sync With The Discover Engine Database

20 In the illustrated embodiment, if the SAN manager database is sufficiently out of synch with the discover engine database to require recovery, e.g., as determined above, the following procedures can be executed by the SAN manager 20 to rebuild the former in whole or in part, optionally, followed with error logging and/or event notification.

1. Clear out SAN manager 20 system database and copy in the discover engine database, thus rebuilding the SAN manager database in entirety.

2. As an alternative to (1), compare the databases in entirety and add in any objects from Discover engine database and delete or mark as missing any objects unique to the
5 SAN manager 20 service database.

3. As an alternative to (1) and (2), which require a pass through one or both databases in their entirety, fix the problem locally. For example, if a Modified Attribute event occurs for an object not in the SAN manager 20 service database, the object is retrieved from the discover engine database ignoring any other discrepancies.

4. Alternative (3) can be expanded to not only get the absent object, but to also look for immediate relationship objects and other neighboring objects that might also be absent. A threshold can be set (and then resort to option (1) or (2)) making it unnecessary to try to match the discover engine database via traversing around the entire SAN Region.
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5. A still further alternative to (3) is to rebuild the topology representation from the scan histories of hosts actually or likely to be coupled to, or in the region of, the device represented by an object that is missing or in connection with which the discrepancy arose. A related alternative is to compare a portion of the topology representation containing that object with a corresponding portion of the discovery engine database (e.g., the scan histories of hosts actually or likely to be coupled to, or in the region of, the
15 device represented by an object) and to add, mark or delete objects in the manner described in alternative (2).
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6. Take no action. With proper coding, no events lost or out of order, etc, this situation should never arise. In addition, if an administrator came to distrust the SAN manager 20 service database, he or she can clear the database and issue discovers.

7. In the event of a significant problem with mismatches between the databases, a severe error message can be generated recommending that the administrator exercise an option similar to options (1) and (2) rather than perform one of these steps automatically.

Alternate Embodiment for Event Processing

10 To obviate the need for the service 38 to retrieve further data from the discover engine during processing of tasks and notifications, N1, N2, N3, . . ., and to engage in conflict resolution as discussed above, the discover engine 40 of alternative embodiments of the invention transmits to the manager service, in addition to a notification, data sufficient for its processing.

15 By way of illustration, referring again to FIGURE 6, in this alternative embodiment, the discover engine 40 communicates a notification regarding one or more changes in topology of the SAN to the manager service 38 in combination with the data that the manager service 38 needs to handle the notification. For example, if the notification relates to a missing storage device, the discover engine 40 not only transmits a "missing device" notification, but it also transmits, with the
20 notification, the identity of the storage device that is missing. This allows the manager service to update its SAN topology database without a need to request additional data from the discover engine. The combination of notification and data, or "smart event" notification, can take the